

CAUTION

If any of the previously mentioned bolts and nuts are loose, refer to Chapter Eleven for correct procedures and torque specifications.

Skid Plates

The skid plates protect the lower end of the engine, the final drive gear case and the rear brake housing from rock damage. These plates should be checked at the interval indicated in **Table 1**.

1. Check the skid plates for wear, cracks or damage. If the skid plates are cracked or damaged, replace them.
2. Also check for loose or missing mounting bolts. Tighten all bolts securely.

Nuts, Bolts and Other Fasteners

Constant vibration can loosen many of the fasteners on the vehicle. Check the tightness of all fasteners, especially those on:

- a. Engine mounting hardware.
- b. Engine crankcase covers.
- c. Handlebar and front steering components.
- d. Gearshift lever.
- e. Kickstarter lever.
- f. Brake pedal and lever.
- g. Exhaust system.

ENGINE TUNE-UP

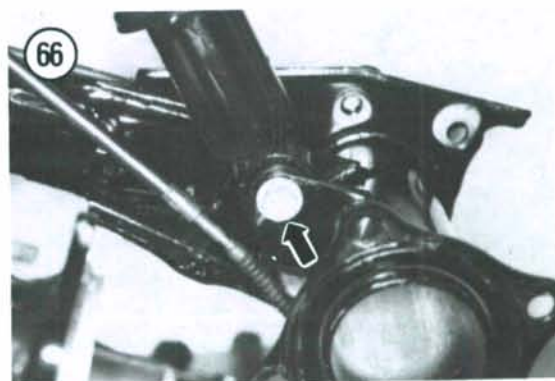
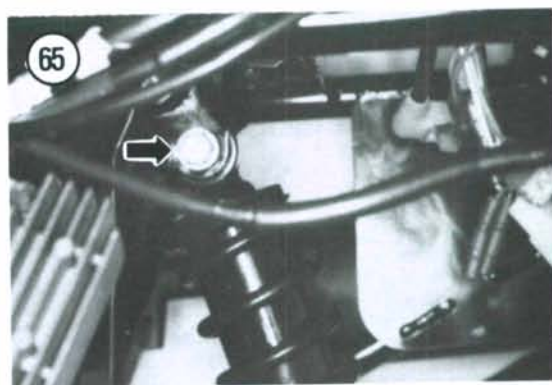
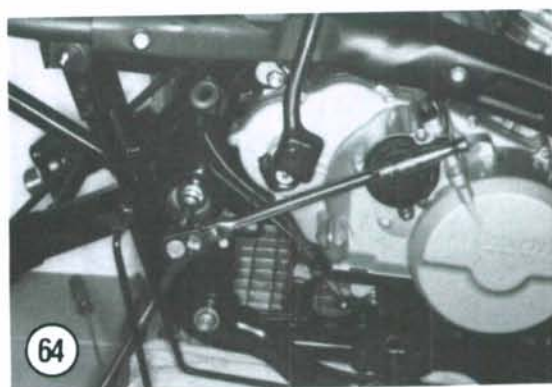
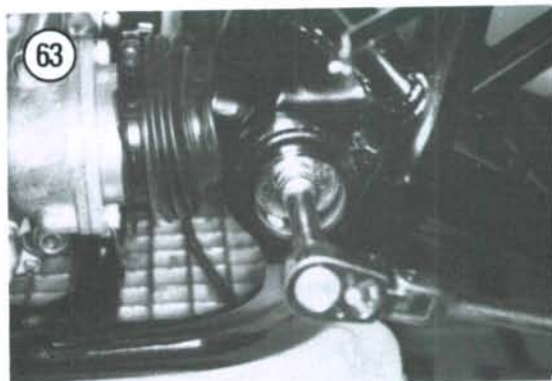
A complete tune-up should be performed at the interval indicated in **Table 1** with normal riding. More frequently, tune-ups may be required if the vehicle is ridden primarily in dusty areas.

The number of definitions of the term "tune-up" is probably equal to the number of people defining it. For the purposes of this book, a tune-up is general adjustment and maintenance to ensure peak engine performance.

Table 5 summarizes tune-up specifications.

The spark plug should be routinely replaced at every other tune-up or if the electrodes show signs of erosion. Have new parts on hand before you begin.

The cam chain tensioner is completely automatic and does not require any periodic adjustment. There



are no provisions for tensioner adjustment on the engine.

The air filter element should be cleaned or replaced prior to doing other tune-up procedures as described in this chapter.

Because different systems in an engine interact, the procedures should be done in the following order.

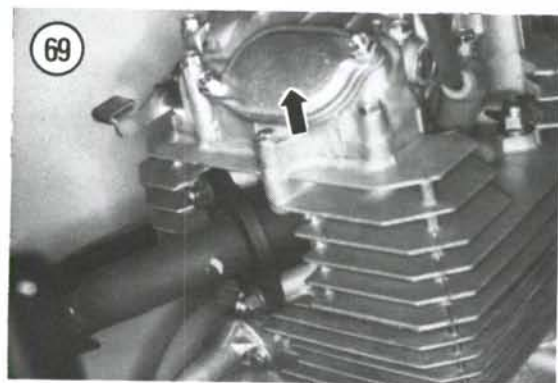
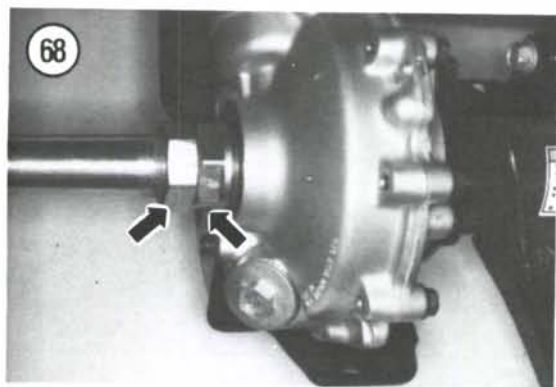
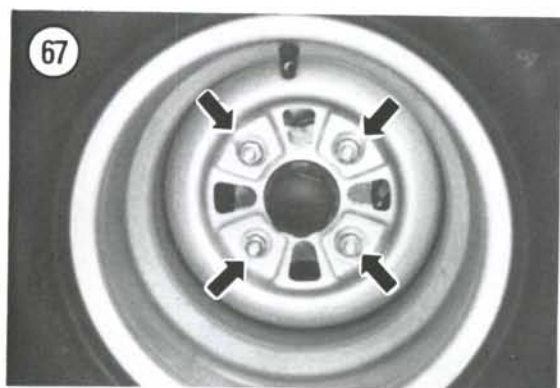
- a. Clean or replace the air filter element.
- b. Adjust valve clearances.
- c. Run a compression test.

- d. Check or replace the spark plug.
 - e. Check the ignition timing.
 - f. Adjust the carburetor idle speed.
- To perform a tune-up on your Honda, you will need the following tools and equipment:
- a. 18 mm spark plug wrench.
 - b. Socket wrench and assorted sockets.
 - c. Flat feeler gauge.
 - d. Spark plug wire feeler gauge and gapper tool.
 - e. Compression gauge.
 - f. Ignition timing light.
 - g. Portable tachometer.

Valve Clearance Adjustment

Valve clearance adjustment must be made with the engine cool, at room temperature (below 35° C/95° F). The correct valve clearance for all models is listed in **Table 5**. The exhaust valve is located on the front of the engine and the intake valve is at the rear of the engine.

1. Place the vehicle on level ground and set the parking brake.
2. Remove the fuel tank as described in Chapter Seven.
3. Remove both valve adjustment covers (**Figure 69**).
- 4A. On 2-wheel drive models, perform the following:
 - a. Remove the timing hole cap (A, **Figure 70**) on the left-hand crankcase cover.
 - b. Remove the crankshaft hole cap (B, **Figure 70**) on the left-hand crankcase cover.
- 4B. On 4-wheel drive models,
 - a. Remove the timing hole cap (A, **Figure 71**) on the left-hand crankcase cover.
 - b. Remove the reduction shaft hole cap (B, **Figure 71**) on the left-hand crankcase cover.
5. Remove the spark plug (this will make it easier to rotate the engine) as described in this chapter.
- 6A. On 2-wheel drive models, use a 17 mm socket on the alternator rotor bolt and rotate the engine *clockwise* until the "T" timing mark aligns with the index mark on the crankcase (**Figure 72**). The piston must be at top dead center (TDC) on the compression stroke.
- 6B. On 4-wheel drive models, use a 6 mm Allen wrench on the starter reduction gear shaft and rotate the engine *counterclockwise* until the "T" timing mark aligns with the index mark on the crankcase



(Figure 72). The piston must be at top dead center (TDC) on the compression stroke.

NOTE

A cylinder at TDC of its compression stroke will have free play in both of its rocker arms, indicating that both the intake and exhaust valves are closed.

7. With the engine timing mark on the "T", if both rocker arms are not loose; rotate the engine an additional 360° until both valves have free play.

8. Check the clearance of both the intake and exhaust valves by inserting a flat feeler gauge between the rocker arm pad and the camshaft lobe (Figure 73). When the clearance is correct, there will be a slight resistance on the feeler gauge when it is inserted and withdrawn.

9. To correct the clearance, perform the following:

- Use a 10 × 12 mm valve wrench (A, Figure 74) and back off the locknut.
- Use a flat-bladed screwdriver (B, Figure 74) and turn the adjuster in or out so there is a slight resistance felt on the feeler gauge.
- Hold the adjuster to prevent it from turning and tighten the locknut to the torque specification listed in Table 3.
- Then recheck the clearance to make sure the adjuster did not slip when the locknut was tightened. Readjust if necessary.

10. Inspect the rubber O-ring gaskets (Figure 75) on the valve adjusting covers. Replace if they are starting to deteriorate or harden, replace as a set even if only one is bad.

11. Install both valve adjuster covers and tighten the bolts securely.

12. Inspect the rubber O-ring gaskets on the caps. Replace if they are starting to deteriorate or harden.

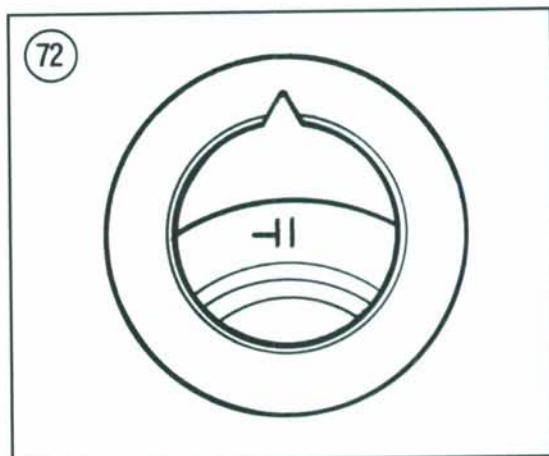
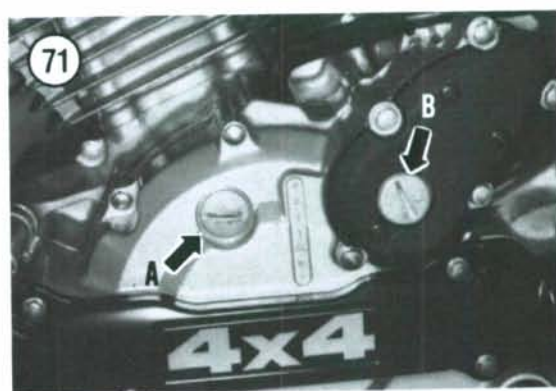
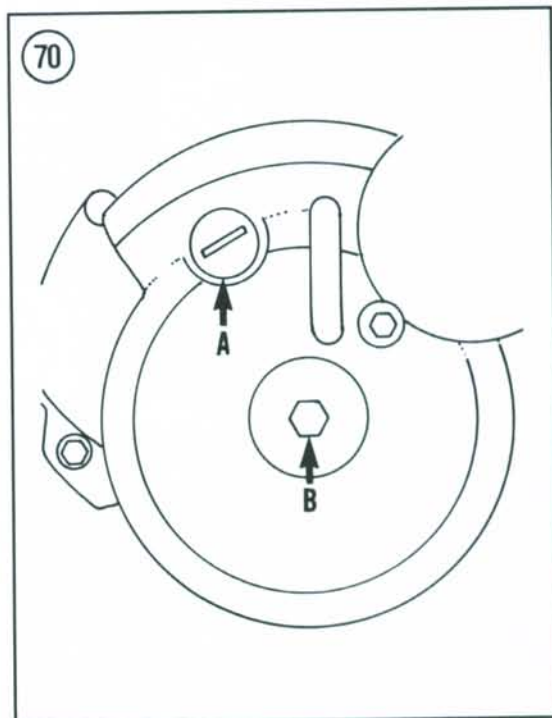
13. Install the timing hole, crankshaft hole (2-wheel drive) and the starter reduction shaft (4-wheel drive) caps. Tighten securely.

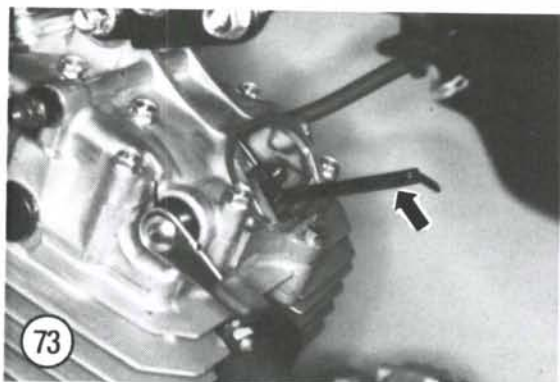
14. Install the spark plug as described in this chapter.

15. Install the fuel tank as described in Chapter Seven.

Spark Plug Selection

Spark plugs are available in various heat ranges, hotter or colder than the plugs originally installed at the factory.

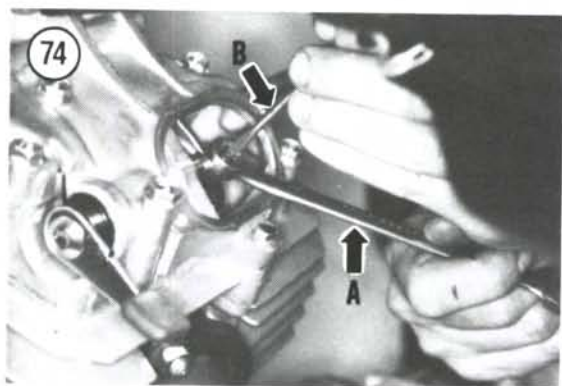




Select a plug of the heat range designed for the loads and conditions under which the vehicle will be run. The use of *incorrect* heat ranges can cause a seized piston, scored cylinder wall or damaged piston crown.

NOTE

For NGK and ND spark plugs, higher plug numbers designate colder plugs; lower plug numbers designate hotter plugs. For example, an NGK DR8ES-L plug is colder than a DR9ES-L plug.



In general, use a hot plug for low speeds and low temperatures. Use a cold plug for high speeds, high engine loads and high temperatures. The plug should operate hot enough to burn off unwanted deposits, but not so hot that it is damaged or causes preignition. A spark plug of the correct heat range will show a light tan color on the portion of the insulator within the cylinder after the plug has been in service.

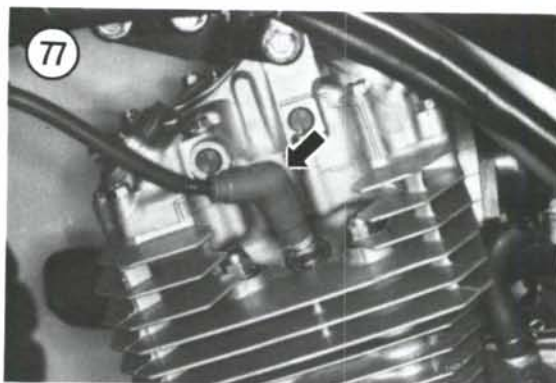
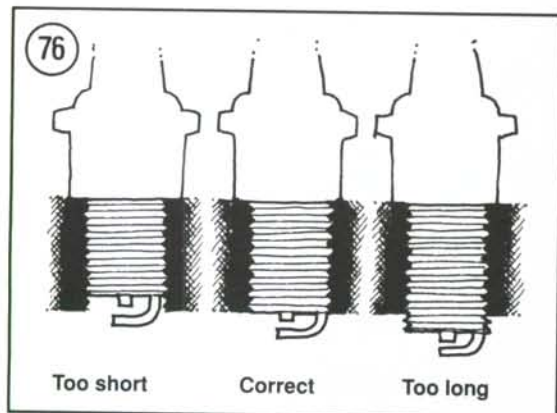
The reach (length) of a plug is also important. A longer than normal plug could interfere with the piston, causing permanent and severe damage; refer to **Figure 76**.

Refer to **Table 5** for Honda factory recommended spark plug heat ranges.



Spark Plug Removal/Cleaning

1. Grasp the spark plug lead (**Figure 77**) as near the plug as possible and carefully pull it off the plug. If it is stuck to the plug, twist it slightly to break it loose.
2. Blow away any dirt that has accumulated in the spark plug well.



CAUTION

The dirt could fall into the cylinder when the plug is removed, causing serious engine damage.

3. Remove the spark plug with an 18 mm spark plug wrench.

NOTE

If the plug is difficult to remove, apply penetrating oil, like WD-40 or Liquid Wrench around the base of the plug and let it soak in about 10-20 minutes.

4. Inspect the plug carefully. Look for a broken center porcelain, excessively eroded electrodes and excessive carbon or oil fouling. If present, replace the plug. If deposits are light, the plug may be cleaned in solvent with a wire brush or cleaned in a special spark plug sandblast cleaner. Regap the plug as explained in the following section.

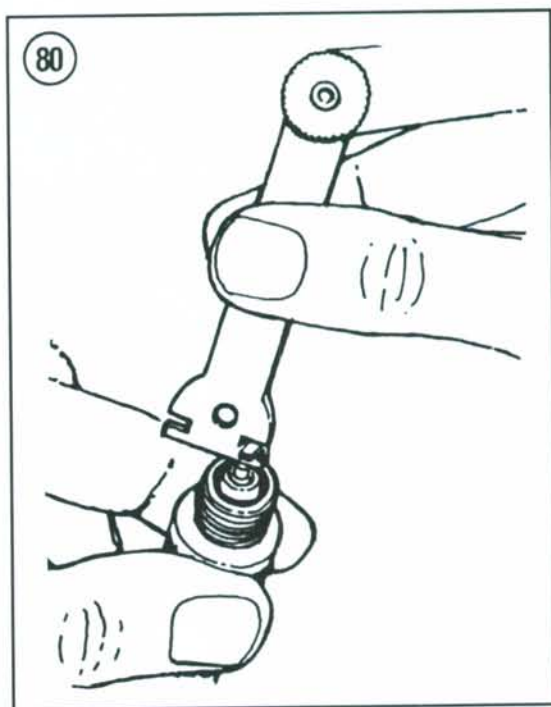
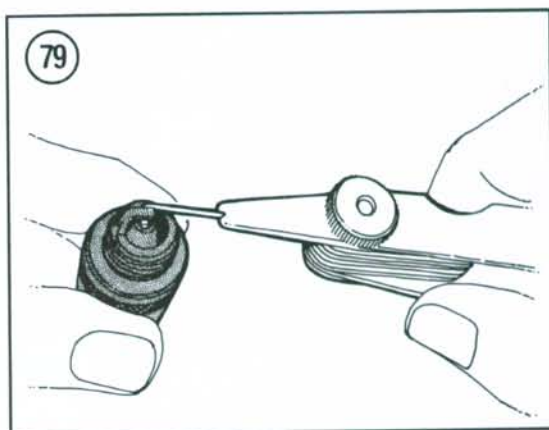
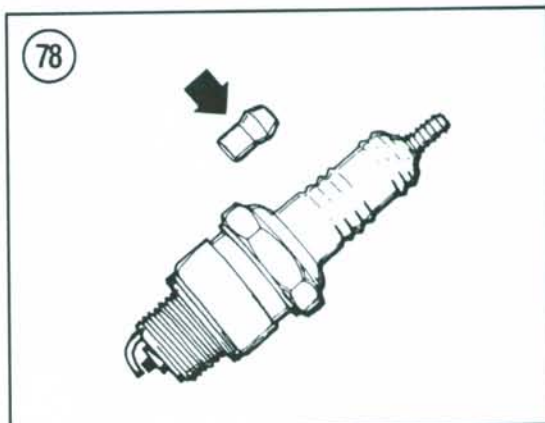
Gapping and Installing the Plug

A spark plug should be carefully gapped to ensure a reliable, consistent spark. You must use a special spark plug gapping tool and a wire feeler gauge.

1. Remove the new spark plug from its box. *Do not* screw on the small piece that is loose in the box (**Figure 78**); it is not used.
2. Insert a wire feeler gauge between the center and side electrode of the plug (**Figure 79**). The correct gap is listed in **Table 5**. If the gap is correct, you will feel a slight drag as you pull the wire through. If there is no drag, or the gauge won't pass through, bend the side electrode with a gapping tool (**Figure 80**) to set the proper gap.
3. Put a small drop of oil or aluminum anti-seize lubricant on the threads of the spark plug.
4. Screw the spark plug in by hand until it seats. Very little effort is required. If force is necessary, you have the plug cross threaded; unscrew it and try again.
5. Use a spark plug wrench and tighten the plug an additional 1/4 to 1/2 turn after the gasket has made contact with the head. If you are installing an old, regapped plug and reusing the old gasket, only tighten an additional 1/4 turn.

NOTE

Do not overtighten. This will only squash the gasket and destroy its sealing ability.



6. Install the spark plug lead; rotate it slightly in both directions and make sure it is on tight.

Reading Spark Plugs

Much information about engine and spark plug performance can be determined by careful examination of the spark plug. This information is more valid after performing the following steps.

1. Ride the vehicle a short distance at full throttle in any gear.
2. Turn the ignition switch to the OFF position before closing the throttle and simultaneously shift to NEUTRAL; coast and brake to a stop.
3. Remove the spark plug and examine it. Compare it to **Figure 81**.

If the insulator is white or burned, the plug is too hot and should be replaced with a colder one.

A too-cold plug will have sooty or oily deposits ranging in color from dark brown to black. Replace with a hotter plug and check for too-rich carburetion or evidence of oil blow-by at the piston rings.

If the plug has a light tan or gray colored deposit and no abnormal gap wear or electrode erosion is evident, the plug and the engine are running properly.

If the plug exhibits a black insulator tip, a damp and oily film over the firing end and a carbon layer over the entire nose it is oil fouled. An oil fouled plug can be cleaned, but it is better to replace it.

Compression Test

At the interval indicated in **Table 1**, check cylinder compression pressure. Record the results and compare them at the next interval. A running record will show trends in deterioration so that corrective action can be taken before complete failure occurs to a given set of parts.

The results, when properly interpreted, can indicate general cylinder, piston ring and valve condition.

1. Start the engine and let it warm up approximately 2-3 minutes.
2. Place the vehicle on level ground and apply the parking brake, shut off the engine.
3. Fully open the throttle lever and move the choke lever all the way to the completely open position.
4. Disconnect the spark plug wire (**Figure 77**) and remove the spark plug.

5. Connect a compression gauge to the cylinder following manufacturer's instructions.

6. Have an assistant operate the starter motor or kickstarter several times.

NOTE

If you perform this operation by yourself, make sure the compression gauge does not leak around the spark plug hole. This will give a false reading.

CAUTION

Do not turn the engine over more than absolutely necessary. When the spark plug lead is disconnected, the electronic ignition will produce the highest voltage possible; the ignition coil may overheat and be damaged.

7. Remove the compression gauge and record the reading. The readings should be as indicated in **Table 5**.

If the reading is higher than normal, there may be a buildup of carbon deposits in the combustion chamber or on the piston crown.

If a low reading (10% or more) is obtained it indicates a leaking cylinder head gasket, valve(s) or piston ring trouble. If the gasket is okay, then determine which other component is faulty.

Turn the engine over once to distribute the oil, then take another compression reading. If the compression increases significantly, the valves are good but the piston rings are defective. If compression does not increase, the valves require servicing. A valve could be hanging open but not burned or a piece of carbon could be on a valve seat.

Ignition Timing

All models are equipped with a capacitor discharge ignition system (CDI). This system uses no breaker points, but timing does have to be checked to make sure all components of the ignition system are functioning properly.

Incorrect ignition timing can cause a drastic loss of engine performance and efficiency. It may also cause overheating.

Before starting on this procedure, check all electrical connections related to the ignition system. Make sure all connections are tight and free from corrosion and that all ground connections are clean and tight.

81

SPARK PLUG CONDITION

**NORMAL**

- Identified by light tan or gray deposits on the firing tip.
- Can be cleaned.

**GAP BRIDGED**

- Identified by deposit buildup closing gap between electrodes.
- Caused by oil or carbon fouling. If deposits are not excessive, the plug can be cleaned.

**OIL FOULED**

- Identified by wet black deposits on the insulator shell bore and electrodes.
- Caused by excessive oil entering combustion chamber through worn rings and pistons, excessive clearance between valve guides and stems, or worn or loose bearings. Can be cleaned. If engine is not repaired, use a hotter plug.

**CARBON FOULED**

- Identified by black, dry fluffy carbon deposits on insulator tips, exposed shell surfaces and electrodes.
- Caused by too cold a plug, weak ignition, dirty air cleaner, too rich a fuel mixture, or excessive idling. Can be cleaned.

**LEAD FOULED**

- Identified by dark gray, black, yellow, or tan deposits or a fused glazed coating on the insulator tip.
- Caused by highly leaded gasoline. Can be cleaned.

**WORN**

- Identified by severely eroded or worn electrodes.
- Caused by normal wear. Should be replaced.

**FUSED SPOT DEPOSIT**

- Identified by melted or spotty deposits resembling bubbles or blisters.
- Caused by sudden acceleration. Can be cleaned.

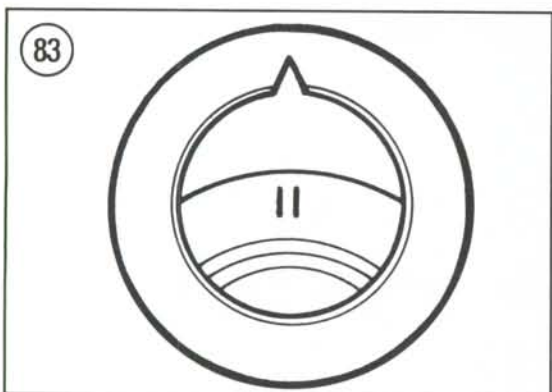
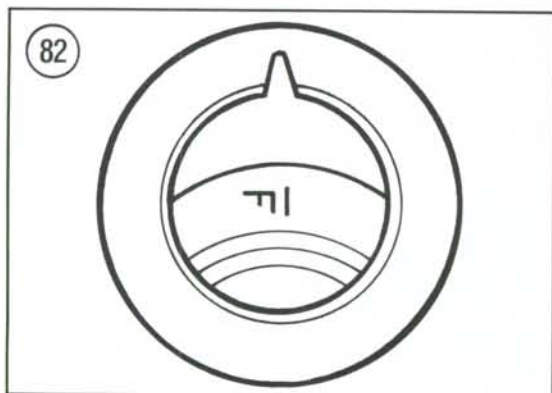
**OVERHEATING**

- Identified by a white or light gray insulator with small black or gray brown spots and with bluish-burnt appearance of electrodes.
- Caused by engine overheating, wrong type of fuel, loose spark plugs, too hot a plug, or incorrect ignition timing. Replace the plug.

**PREIGNITION**

- Identified by melted electrodes and possibly blistered insulator. Metallic deposits on insulator indicate engine damage.
- Caused by wrong type of fuel, incorrect ignition timing or advance, too hot a plug, burned valves, or engine overheating. Replace the plug.

1. Start the engine and let it warm up approximately 2-3 minutes.
2. Place the vehicle on level ground and apply the parking brake, shut off the engine.
- 3A. On 2-wheel drive models, remove the timing hole cap (A, **Figure 70**) on the left-hand crankcase cover.
- 3B. On 4-wheel drive models, remove the timing hole cap (A, **Figure 71**) on the left-hand crankcase cover.
4. Connect a portable tachometer following the manufacturer's instructions.
5. Connect a timing light following the manufacturer's instructions.
6. Restart the engine and let it idle at the idle speed indicated in **Table 5**.
7. Adjust the idle speed if necessary as described in this chapter.
8. Aim the timing light at the timing window and pull the trigger. The timing is correct if the "F" mark aligns with the fixed index mark (**Figure 82**).
9. To check the ignition advance, perform the following:
 - a. Increase engine speed to $4,500 \pm 100$ rpm and check the ignition advance.



- b. Aim the timing light at the timing window and pull the trigger. The timing is correct if the "II" mark aligns with the fixed index mark (**Figure 83**).

10. If timing is incorrect, test the CDI unit and the pulse generator as described in Chapter Eight.

11. Disconnect the timing light and portable tachometer.

12. Install the timing hole cap onto the left-hand crankcase cover and tighten securely.

Carburetor Idle Mixture

The idle mixture (pilot screw) is preset at the factory and *is not to be reset*. Do not adjust the pilot screw unless the carburetor has been overhauled. If so, refer to *Pilot Screw Adjustment* in this chapter.

Pilot Screw Adjustment

NOTE

The pilot screw is pre-set at the factory. Adjustment is not necessary unless the carburetor has been overhauled or someone has misadjusted it.

The air filter element must be clean before starting this procedure.

1. For preliminary adjustment, carefully turn the pilot screw in until it *lightly* seats, then back it out the following number of turns:

- a. 1988-1991: 1 3/4 turns out.
- b. 1992: 1 5/8 turns out.
- c. 1993-1997: 2 1/4 turns out.
- d. 1998-on:

California models: 2 1/2 turns out.

49-state: 2 1/4 turns out.

2. Start the engine and let it reach normal operating temperature. Stop-and-go riding for approximately 10-15 minutes is usually sufficient.

3. Shut the engine off.

4. Place the vehicle on level ground and apply the parking brake.

5. Connect a tachometer following the manufacturer's instructions. Use a tachometer that can register a change of 50 rpm.

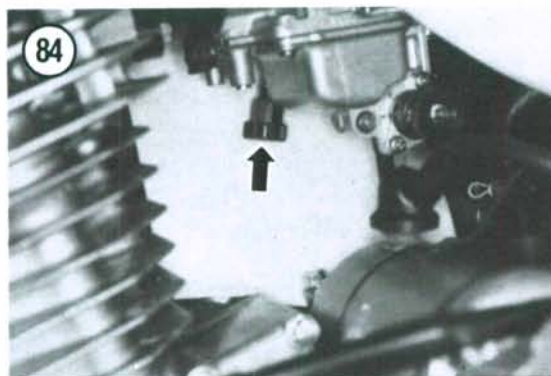
6. Start the engine and turn the idle adjust screw (**Figure 84**) in or out to achieve the idle speed listed in **Table 5**.

7. Turn the pilot screw (**Figure 85**) clockwise or IN slowly until the engine starts to miss or decreases in idle speed. Note the screw location at this point.

7. Turn the pilot screw (**Figure 85**) *clockwise* or IN slowly until the engine starts to miss or decreases in idle speed. Note the screw location at this point.
8. Next turn the pilot screw (**Figure 85**) *counter-clockwise* or OUT slowly until the engine starts to miss or decreases in idle speed. Note the screw location at this point.
9. Center the pilot screw exactly at the mid-point between the 2 locations achieved in Step 7 and Step 8.
10. If necessary, readjust idle speed to achieve the idle speed listed in **Table 5**.
11. Disconnect the portable tachometer.
12. After the adjustment is completed, test ride the vehicle. Throttle response should be rapid without hesitation.

Idle Speed Adjustment

Before making this adjustment, the air filter must be clean and the engine must have adequate compression; see *Compression Test* in this chapter.



1. Start the engine and let it warm up approximately 2-3 minutes.
2. Place the vehicle on level ground and apply the parking brake, shut off the engine.
3. Connect a portable tachometer following the manufacturer's instructions.
4. Restart the engine and set the idle speed by turning the idle speed adjust screw (**Figure 84**).
5. The correct idle speed is listed in **Table 5**.
6. Open and close the throttle a couple of times; check for variation in idle speed. Readjust if necessary.

WARNING

With the engine idling, move the handlebar from side to side. If idle speed increases during this movement, the throttle cable needs adjusting or may be incorrectly routed through the frame. Correct this problem immediately. Do not ride the vehicle in this unsafe condition.

7. Turn the engine off and disconnect the portable tachometer.

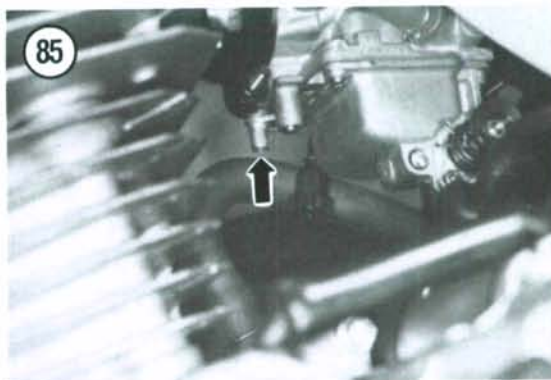


Table 1 MAINTENANCE SCHEDULE*

Prior to each ride
Inspect tires and rims and check inflation pressure
Every 30 operating days
Change engine oil and oil filter Clean and oil air filter element (perform sooner if used in wet or dusty terrain) Check and adjust the carburetor Check ignition timing Check cylinder head nuts and exhaust pipe nuts, tighten if necessary Inspect valve clearance, adjust if necessary Clean spark arrestor Inspect brake hoses for cracked or swollen ends, replace if necessary Check brake fluid level in master cylinder, add fluid if necessary Check throttle operation, adjust if necessary Check and adjust clutch free play Inspect reverse lock mechanism free play, adjust if necessary Check and adjust brakes Check and adjust rear brake pedal free play Lubricate rear brake pedal and shift lever Lubricate control cables Check tire and wheel condition Check wheel bearings for smooth operation Check engine mounting bolts for tightness Check chassis bolts for tightness Inspect skid plate for wear or damage, tighten all mounting bolts
Every year
Inspect and clean spark plug, regap if necessary Clean fuel filter or strainer Inspect fuel line for deterioration, chafed, cracked or swollen ends, replace if necessary Check oil level in final drive unit, add oil if necessary Check oil level in front differential unit, add oil if necessary (4-wheel drive) Check oil level in front gear case, add oil if necessary (4-wheel drive) Drain crankcase breather sediment from hose Inspect front steering for looseness Check front suspension toe-in Check front steering shaft bearings, lubricate if necessary Check brake lining wear indicator or brake lining thickness
Every 2 years
Replace hydraulic brake fluid Replace oil in final drive unit Replace oil in front differential unit (4-wheel drive) Replace oil in front gear case (4-wheel drive)
Every 4 years
Replace fuel hoses Replace flexible brake hoses
* This Honda Factory maintenance schedule should be considered a guide to general maintenance and lubrication intervals. Harder than normal use (racing) and exposure to mud, water, sand, high humidity, etc. will naturally dictate more frequent attention to most maintenance items.

Table 2 TIRE SIZE AND INFLATION PRESSURE (COLD)*

Table 2. TIRE SIZE AND INFLATION PRESSURE (CONT.)			
Tire size			
2-wheel drive			
Front		AT23 X 8-11	
Rear			
1988-1991		AT25 X 12-9	
1992-on		AT25 X 11-9	
4-wheel drive			
Front		AT23 X 8-11	
Rear		AT24 X 9-11	
Tire pressure			
	Standard psi (kPa)	Minimum psi (kPa)	Maximum psi (kPa)
2-wheel drive			
Front	2.9 (20)	2.5 (17)	3.3 (23)
Rear	2.9 (20)	2.5 (17)	3.3 (23)
4-wheel drive			
Front	4.4 (30)	3.8 (26)	5.0 (34)
Rear	2.9 (20)	2.5 (17)	3.3 (23)
* Tire inflation pressure for factory equipped tires. Aftermarket tires may require different inflation pressure.			

Table 3 MAINTENANCE AND TUNE-UP TIGHTENING TORQUES

Item	N•m	ft.-lb.
Oil filter cover bolts	10	7
Oil drain plug	25	18
Front gear case drain bolt (4-wheel drive)	22	16
Front differential (4-wheel drive)		
Drain bolt	12	9
Oil fill cap	12	9
Final drive unit		
Drain bolt	12	9
Oil fill cap	12	9
Clutch adjust screw locknut	17	12
Valve adjuster locknut	17	12

Table 4 REFILL CAPACITIES

Item and Oil Type	Quantity
Engine oil	
Oil drain only	2.2 L (2.3 U.S. qt.)
Oil drain and filter change	2.25 L (2.38 U.S. qt.)
After disassembly	2.5 L (2.6 U.S. qt.)
Front gear case oil (4-wheel drive)	
Oil drain	190 cc (6.4 oz.)
After disassembly	200 cc (6.8 oz.)
Oil type	API SF or SG SAE 10W-40 engine oil
(continued)	

Table 4 REFILL CAPACITIES (continued)

Item and Oil Type	Quantity
Front differential (4-wheel drive)	
1988	
Oil drain	90 cc (3.0 oz.)
After disassembly	100 cc (3.4 oz.)
1989-on	
Oil drain	190 cc (6.4 oz.)
After disassembly	200 cc (6.8 oz.)
Oil type: Hypoid gear oil SAE 80	
Final drive unit	
Oil drain	90 cc (3.0 oz.)
After disassembly	100 cc (3.4 oz.)
Oil type: Hypoid gear oil SAE 80	
Fuel tank	
Total capacity	12.5 L (3.3 U.S. gal.)
Reserve	2.5 L (0.7 U.S. gal.)

Table 5 TUNE-UP SPECIFICATIONS

Valve clearance (Intake and Exhaust)	0.15 mm (0.006 in.)
Spark plug	
Standard	NGK DPR8EA-9, ND X24EPR-U9
Cold weather	NGK DPR7EA-9, ND X22EPR-U9
High speed	NGK DPR9EA-9, ND X27EPR-U9
Spark plug gap	0.8-0.9 mm (0.031-0.035 in.)
Compression pressure	
(at sea level)	1,250-1,450 kPa (178-206 psi)
Idle speed	
1988-1990	1,400-1,600 rpm
1991-on	1,300-1,500 rpm

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